

Appln. No. 10/684,164
Amdt. dated 04/10/2007
Reply to Office Action dated 10/10/2006

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REMARKS

A. Confirmation of Election of Non-Elected Claims

Applicant hereby confirms election of claims 1-23.

B. Rejection of Claims 1-23 Pursuant to 35 U.S.C. 112, first paragraph

Claims 1-23 were rejected under 35 U.S.C. 112, first paragraph, as allegedly failing to comply with the enablement requirement. As stated in paragraph 6 of the Office Action:

The claims recite controlling the cooling unit via the CO₂ concentration measurement device. In particular, the claims recite turning off the cooling unit when the CO₂ concentration measurement is below a threshold value. It is not understood just what effect controlling the cooling unit would have on CO₂ levels.

For the reasons set forth below, this rejection is respectfully traversed.

It appears there is a fundamental misunderstanding as to what Applicant is claiming as his invention. Applicant is not using a measurement of CO₂ concentration to simply control CO₂ levels, as is the case with Rosen, which will be disclosed below. Thus, when Applicant uses a threshold value to turn off the cooling unit, CO₂ levels are not effected. What is effected is the amount of energy the system is using. This is because rather than simply using CO₂ concentration measurements to decide when fresh air is needed, or inner air must be recirculated (as is taught by Rosen), Applicant is using a measurement of CO₂ concentration to decide when a cooling unit should be turned off (i.e., put in an inactive state) to save energy by not cooling air when there is nobody in the area that would otherwise be cooled. Thus, Applicant's invention "takes advantage of the fact that Carbon Dioxide (CO₂) gas concentration measured in Parts-Per-Million (PPM) is a very effective surrogate indicator of human presence in an enclosed space." (Page 5, lines 23-25.) This is explained further, and in detail, at page 12, line 17 through page 14, line 5 of Applicant's specification as follows:

Referring back to Figure 1, the object of the present Capno-Switch is to function as a fresh air controller for an air-conditioner and as such it controls the

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fan F, the cooling unit AC and the fresh air damper DM, which allows the influx of fresh air from the outside when it is open or half-open, of the air-conditioner. One especially preferred embodiment is to have five control settings for a particular air-conditioner corresponding to the CO₂ level measured in the cold air duct as <600 PPM, <1,000 PPM, <2,000 PPM, <3,000 PPM and <4,000 PPM, respectively. Even with a nominal CO₂ setting hysteresis of 10%, the safe range for the Capno-Switch to drift over time before it will affect the multiple-settings for the control of the CO₂ level in the cold air duct is hundreds of PPM. Thus, with the novel features of the present invention incorporated into the conventional single-beam CO₂ detector, the relatively small CO₂ measurement error to be expected of the Capno-Switch over time is deemed operationally tolerable and relatively insignificant.

An example of an especially preferred embodiment for the Capno-Switch to control the fan F, Cooling Unit AC and the fresh air damper DM is presented as follows. When the measured CO₂ level in the cold air duct is < 600 PPM indicative of the fact that there is nobody in the conditioned space in question, the Capno-Switch will turn off all the relevant functions of the air-conditioner, namely the fan F, the Cooling Unit AC and the fresh air damper DM will all be shut off. When the measured CO₂ level is <1,000 PPM, only the fan F is turned on. When the measured CO₂ level is <2,000 PPM, both the fan F and the Cooling Unit AC will be turned on but the fresh air damper DM remains shut. When the measured CO₂ level is <3,000 PPM, both the fan F and the Cooling Unit AC will remain "ON" while at the same time the fresh air damper DM will be opened half-way. Finally, if the measured CO₂ level is above 3,000 PPM, not only do the fan F and the Cooling Unit AC remain "ON", the fresh air damper DM will now be fully open so as to bring in as much fresh air as possible from the outside to the conditioned space. Thus, it is clear that the present invention, viz. the Capno-Switch, is capable of addressing automatically the air quality issue within a conditioned space using CO₂ level as the surrogate human presence indicator. Furthermore, it has the potential to save energy as it will effectively

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shut down the entire air-conditioner unit when it detects that nobody is in the conditioned space (CO2 level < 600 PPM).

The present invention also lends itself to customization by different manufacturers, for different intended uses, or for customization by the end users. Once one understands the teaching of the present invention that a CO2 concentration measurement can be used to control when the cooling unit, the fan and the fresh air damper are active or non-active according to a preselected set of rules, many different sets of rules can be developed or adopted to fit different scenarios, and the rules can be subject to modification or exceptions or even to an override condition. For example, even though a preselected set of rules might cause the cooling unit, the fan and the air damper to be turned off when the CO2 concentration measurement is below a first threshold value, the rules can be modified to leave the cooling unit and/or the fan on if the temperature of air in the enclosed space is below a temperature threshold or when an override condition is selected or when a comfort level trigger is triggered. Or, to give another example, certain rules might be modified, overrode or varied based upon external conditions, such as time of day, to minimize use of power during peak periods when energy is most expensive. In addition, a user can be allowed to select the preselected set of rules that will be applied in a given unit from a plurality of preselected rules, or override at least one of the preselected set of rules, or even modify at least one of the preselected set of rules.

Thus, the present invention uses the concentration of CO2 for an enclosed space to control when the cooling unit, the fan and the fresh air damper are active or non-active, and this is what is claimed in claim 1. As noted above, when the CO2 level is below a first threshold level (see claim 2), the cooling unit, the fan and the air damper will all be turned off. This will be because a CO2 level below the first threshold level means nobody is present in the enclosed space, so there is no need to expend energy in modifying the air in that enclosed space when there is no human there to inhale the air. As the CO2 level increases, different things will happen, according to a preselected set of rules, all of which was described above in Applicant's specification.

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Accordingly, it is respectfully submitted that Applicant's specification is enabling and that it adequately explains how CO2 concentration levels are used, according to a preselected set of rules, to control when the cooling unit, the fan and the fresh air damper are either or inactive, and no prima facie case of non-enablement has been made out.

C. Claim Rejections Pursuant to 35 USC §102

Claims 1, 2, 4-7, 12, 14, 15 and 17-20 were rejected under 35 U.S.C. 102(b) as allegedly being anticipated by Rosen (USP 6,578,770). For the reasons set forth below, this rejection is respectfully traversed.

Rosen is directed to a method for monitoring and controlling CO2 levels. There is absolutely no teaching in Rosen that a CO2 concentration measurement from an enclosed space serviced by the air conditioner can be used to control when the cooling unit, the fan and the fresh air damper are active or non-active according to a preselected set of rules, nor does Rosen inherently operate according to such a preselected set of rules.

Indeed, the fact that claims 1-23 were rejected pursuant to 35 U.S.C. 112, first paragraph for the reasons set forth above is indicative of not only the fact that Rosen does not disclose what Applicant claims, but also that the teachings of Applicant are non-obvious.

Again, to put it simply, Rosen never teaches, discloses or suggests that a CO2 measurement should be used to decide when the cooling unit, the fan and the fresh air damper are active or non-active. Instead, Rosen teaches that the CO2 measurement is used to decide when circulation or fresh air is needed, but not when the whole system should be shut down. This is why Applicant's invention is such a step forward in energy management. It represents a radical new approach toward controlling an air conditioner with a cooling unit, a fan and a fresh air damper that takes advantage of the fact that CO2 gas concentration measured in Parts-Per-Million (PPM) is a very effective surrogate indicator of human presence in an enclosed space.

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D. Claim Rejections Pursuant to 35 USC §103(a)

Claims 3, 8-11, 13, 16 and 21-23 were rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over Rosen. For the reasons set forth below, this rejection is respectfully traversed.

Paragraph 9 of the Office Action admits that "Rosen discloses the claimed invention except for the recitation of the cooling unit being turned off or on depending on the CO2 concentration levels...." However, this is a critical element of Applicant's invention, and why it saves energy. There is no teaching or suggestion in Rosen that CO2 concentration levels can be used, as noted above in part C, to turn off the cooling unit. Moreover, while paragraph 9 of the Office Action goes on to allege "[t]he control of the cooling unit by the detection of CO2 concentration levels is considered to be a matter of obvious choice, as no benefit or change of the CO2 levels is believed to result from the operation of a cooling unit," Applicant respectfully challenges this assertion as not only incorrect, but as strong evidence of non-obviousness. Again, the conventional wisdom is that CO2 concentration levels are measured so that steps can be taken to modify such levels, when need be. By contrast, Applicant uses a concentration level of CO2 below a certain threshold to shut the air conditioning unit off, and leave it off, until CO2 concentration measurements exceed that threshold level, indicating human presence, and justification for expending energy to begin using the air conditioner again. This methodology saves energy and is a tremendous benefit. A benefit that is so unobvious and against the conventional wisdom that it clearly was not recognized by the Examiner, or Rosen, or anybody else prior to Applicant. It is a whole new concept.

F. CONCLUSION

A Change of Correspondence Address is enclosed herewith.

A Petition For Extension Of Time Under 37 CFR 1.136(A) along with a Credit Card Authorization Form for the amount of \$510 for a three month extension of time is also enclosed herewith.

Based upon the foregoing, it is respectfully submitted that the claims are now in condition for allowance. Reexamination and reconsideration are respectfully requested.

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In the event that any changes are needed to place this application in condition for allowance, the undersigned would like to arrange for an Examiner Interview by telephone.

Respectfully submitted,



ROY L. ANDERSON, REG. NO. 30,240
WAGNER, ANDERSON & BRIGHT, LLP
3541 OCEAN VIEW BLVD.
GLENDALE, CA 91202
(818) 249-9300
(818) 249-9335 FACSIMILE